



SITE HEALTH AND SAFETY PLAN
FOR THE
SITE INVESTIGATION OF THE J. PITT MELT SHOP
3151 SOUTH CALIFORNIA AVENUE
CHICAGO, ILLINOIS
FOR

M.S. KAPLAN COMPANY
CHICAGO, ILLINOIS

Prepared JULY 2001

Prepared By
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LIST OF ABBREVIATIONS AND ACRONYMS

ANSI	American National Standards Institute
AOI	Area of Interest
BMWCI	Burns & McDonnell Waste Consultants Inc.
°C	Celsius
CFR	Code of Federal Regulations
CGI	Combustible Gas Indicator
CIH	Certified Industrial Hygienist
CPI	Cooperative Producers, Inc.
CPR	Cardiopulmonary Resuscitation
CSP	Certified Safety Professional
EMS	Emergency Medical Services
°F	Fahrenheit
FAA	Federal Aviation Administration
FSM	Field Site Manager
SHSP	Health & Safety Plan
HAZCOM	Hazard Communication
HSM	Health and Safety Manager
LEL	Lower Explosive Limit
MSDS	Material Safety Data Sheet
MSHA	Mine Safety and Health Administration
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PID	Photoionization Detector
PM	Project Manager
PPE	Personal Protective Equipment
PPM	Parts per Million
PVC	Poly Vinyl Chloride
SOP	Standard Operating Procedure
SSHS	Site Safety and Health Supervisor
SVE	Soil Vapor Extraction
USACOE	U.S. Army Corp of Engineers
USEPA	U. S. Environmental Protection Agency
UST	Underground Storage Tanks
VOC	Volatile Organic Compound
WBG	Wet Bulb Globe Temperature

TABLE 1
SITE AIR MONITORING SUMMARY

Area of Interest or Site Activity	Potential Chemical Hazard	Initial Level of PPE	Monitoring Equipment
SI/RA at Site	PCBs Lead Chromium Cadmium Petroleum Hydrocarb. BTEX PAHs Radioactives (Cs-137) Asbestos	Modified Level D	CGI PID with 10.6 eV lamp Detector tube for benzene Radiation Survey Meter

EMERGENCY INFORMATION

Site Emergencies Call:

Ambulance 911

Fire: 911

Police: 911

Poison Control Center: 1-800-942-5969 (IL)

National Response Center: 1-800-424-8802

Spills: USEPA 312-353-2318
IEPA 217-782-3637
CHICAGO
Dept. of Environment 312-744-7672

Hospital General – 773-521-1710
Emergency Room – 713-484-4080

St. Anthony's Hospital
2875 West 19th Street
Chicago, Illinois

Directions to St. Anthony's Hospital

From the Site, go north on South Carolina Avenue for 1.3 miles. Turn left (west) onto 19th street. Go .1 miles to hospital. Entrance is on left.

Approximate travel time is 5 minutes.

EMERGENCY ASSEMBLY LOCATION: To be determined upon arrival at Site

FIRST AID MEASURES

In the event that personnel exhibit symptoms of exposure, the following procedures will be used:

Petroleum Hydrocarbons:

Eye Contact: Flush eye immediately with copious amount of water for a minimum of 15 minutes.

Repeat until irritation is eliminated and seek medical attention.

Skin Contact: Wash exposed area with soap and water for at least 15 minutes. If dermatitis or severe reddening occurs, seek medical attention.

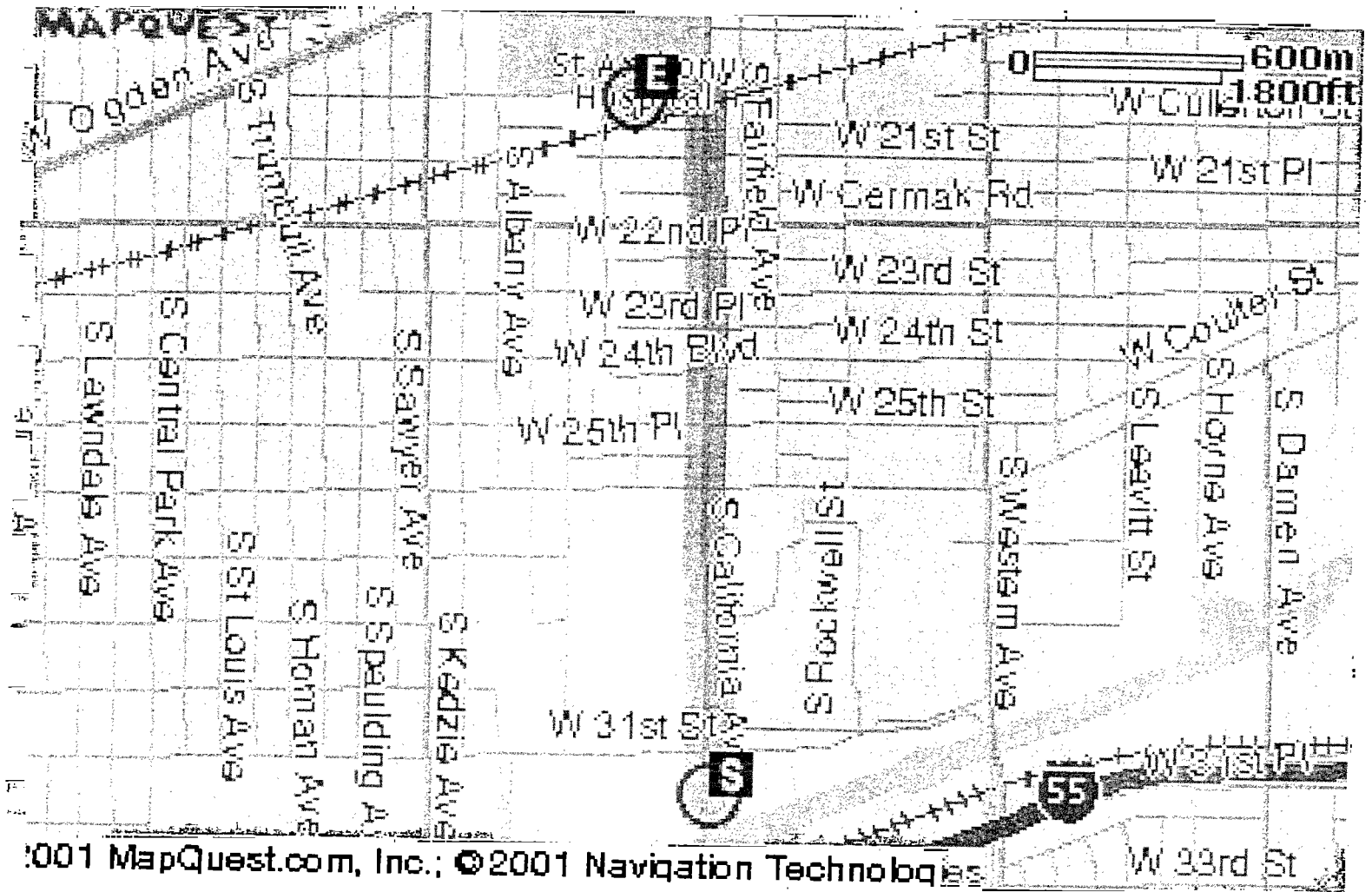
Inhalation: Move the person into fresh air. If symptoms persist, seek medical attention.

Ingestion: Do not induce vomiting. Seek immediate medical attention.

Important Numbers:

Project Manager:	Lawrence Fieber	630-990-0300 ext 237
Project Coordinator:	Frank Capic	630-990-0300 ext 251
Field Site Manager	TBA	
Site Health & Safety Supervisor	TBA	
Project Health & Safety Manager	Eric Wenger	816-822-3894
Health & Safety Manager	Ken Grist	(816) 822-3940
Safety Equipment for BMWCD	Bob Krey	(816) 333-9400 x5303
Illinois One-Call Dig-Rite		1-800-892-0123

EMERGENCY MEDICAL ROUTE TO HOSPITAL



St. Anthony's Hospital
2875 West 19th Street
Chicago, IL

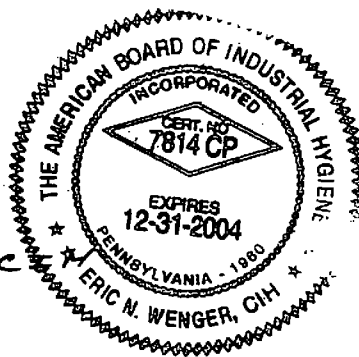
Emergency Room: 713-484-4080

Site Location:
3151 South California Ave.
Chicago, IL

Project Name: J PITT MELT SHOP
Project Number: 27695
Location: 3151 South California Avenue
Chicago, Illinois

Date Plan Approved: July 5, 2001

Reviewer's Signature: Eric Wenger



1.0 -- INTRODUCTION

1.1 GENERAL

This Health and Safety Plan (SHSP) has been prepared by Burns & McDonnell Waste Consultants Division (BMWCD) for the activities associated with the sampling, identification, and possible removal of hazardous materials at the J.Pitt Metal Shop located at 3151 South California Avenue, Chicago, Illinois.

The health and safety protocols established in this plan are based on Burns & McDonnell Waste Consultants Division *Corporate Health and Safety Policy and Procedures for Hazardous and Special Waste Operations*, Section B, Burns & McDonnell's *Corporate Health and Safety Policy and Procedure Manual*, past field experiences, specific site conditions, and chemical hazards known or anticipated to be present from available site data. The following site Health and Safety Plan (SHSP) is intended solely for use during the proposed activities described in the project documents and technical specifications. Specifications herein are subject to review and revision based on actual conditions encountered in the field during site characterization activities. Such changes may be instituted by using the SHSP Field Amendment Form (see Appendix B).

Before site operations begin, all employees, including subcontractors for BMWCD covered by this plan, involved in these operations will have read and understood this SHSP and all revisions. Before work begins, all affected environmental workers will sign the Agreement and Acknowledgment Form (see Appendix B).

1.2 SITE HISTORY

The J. Pitt Melt Shop is located at 3151 South California Avenue in Chicago Illinois. In April, the City of Chicago Department of Environment observed an oil-based waste being released from the sheet pile wall along the south side of the property. After further investigation the city and the EPA documented the

source appeared to be under the building structure in the vicinity of the electrical switch room. M.S. Kaplan Company has asked Burns & McDonnell to conduct a site reconnaissance in conjunction with the USEPA to evaluate site conditions which include waste of lead, cadmium, and polychlorinated biphenyls (PCBs).

1.3 SCOPE

This project consists of:

- A) surface soil sampling for possible lead, chromium, and cadmium contaminants,
- B) drum sampling to perform hazardous categorization tests on selected liquid filled drums,
- C) collect soil samples from test pits (maximum 12 feet bgs) on backhoe-dug pits,
- D) sample dust within factory baghouses and slag piles for contamination,
- E) sample resinous materials containing PCBs,
- F) Maintain an oil sorbent boom
- G) Collect water samples from open sumps, pits, and lagoons

Note: No personnel will need or be allowed to enter any excavations or confined spaces at this project site.

1.4 SUBCONTRACTOR ACTIVITIES

Subcontractor operations at the site will consist of backhoe digging of soil sampling pits within the compound and the removal of radioactive material inside mold-level gauges and needles.

* * * * *

2.0 – PROJECT ORGANIZATION

Key participants for this project include the Site Health and Safety Supervisor (SHSS), Field Site Manager (FSM), Project Manager/Coordinator (PM), and the Project Health and Safety Manager (PHSM). The SHSS, project team members, subcontractors, and visitors will be under the direct supervision of the Burns & McDonnell WCD Field Site Manager (or designated representative) who will report to the Project Manager/Coordinator. Individuals are identified by their titles in the Emergency Information section of this plan.

2.1 SITE HEALTH AND SAFETY SUPERVISOR (SHSS):

The Site Health and Safety Supervisor (SHSS) will establish a full-time Site presence for the purpose of overseeing Burns & McDonnell WCD personnel on the Site. The SHSS has the authority to implement and enforce the Site Health and Safety Plan. The SHSS will report to the Field Site Manager on matters concerning the health and safety of employees and/or public. The SHSS may be required to serve as the backup on-scene incident commander in emergency situations. The SHSS should be consulted before any changes in procedures or protective clothing are made. The responsibilities of the SHSS at the Site include the following:

- X The SHSS is to be trained and certified in the HAZWOPER 8-hour Supervisor Training, First Aid, CPR and bloodborne pathogens, heat related illnesses and cold stress conditions, and Respiratory Protection Training.
- X Conducting regular (at least weekly) safety meetings for Site personnel and subcontractors and summarize the training in the field logbooks. The following topics must be covered during safety meetings:
 - Hazard Communication (i.e., MSDS location, and container labeling, chemical hazards of non-routine tasks).
 - Determine applicability of Standard Operating Procedures (SOP) in Chapter 8 and communicate procedures.
 - Review emergency Hand Signals (Section 9.5).

- Give refresher training on heat or cold stress (Section 5.2 and 5.3) when appropriate.
 - Review Site emergency procedures.
 - Discuss location and use of a rig kill switch for drilling/boring operations.
- X Twice daily conduct calibration and/or field leak test of direct-reading instruments. Record calibration checks in the field logbook and on the Field Calibration Record.
- X Approve and sign completed Field Safety Checklist for Intrusive Activities before drilling, boring, or excavating.
- X Use caution tape or other methods to establish and restrict access to the exclusion zone to Site investigation personnel only.
- X Check that Air Monitoring results are recorded on the boring logs. Record into field logbooks positive air monitoring results from the breathing zone. For negative results, record into logbooks a general entry stating that air monitoring was conducted.
- X If PPE upgrade is necessary, follow this chain of communication: SHSS informs FSM who informs PM who communicates to the Project Health and Safety Manager (PHSM).
- X Check that medical monitoring occurs for Site personnel e.g., pulse rate during conditions of heat stress.
- X During cold conditions measure and record into field logbooks ambient temperature and estimated wind speed.
- X For loud operations, evaluate noise levels using a noise level survey meter.
- X Visually inspect conditions of all PPE and other equipment once decontamination procedures are completed.

- X Conduct daily safety inspections of the Site, and record the results of the inspections in the field logbook. Record in the field logbook corrective measures taken when potential hazards were identified. For other hazards, refer them to the FSM for correction. Record the communication transaction in the field logbook. If necessary for immediate hazards, shut down field operations.

- X Inspect monthly any SCBA's on Site, in storage, or after each use.

- X At a minimum, any manhole, pipe, tank or hazardous excavation that must be entered will be a permit-required confined space. The SHSS will direct the Burns & McDonnell WCD confined space entry procedures. Procedures involve Site investigation, completion, signing and posting of a confined space entry permit that includes air-testing results, before entry. The SHSS must be trained annually in confined space entry before supervising confined space activities.

- X Check that all employees, visitors, and subcontractors read and sign the SHSP before entering the Site.

- X Before drilling/boring activities check that overhead electrical lines are at least 10 feet away and that no other overhead obstructions are present, for voltages 0-50 kV. For voltages greater than 50 kV refer to OSHA 29 CFR 1926.550 (a) (15) and 29 CFR 1910.333 (i) (1).

- X In case of accident, near miss, or emergency response, conduct an incident investigation and document on the report form in Appendix B then submit to the PHSM with a copy placed into the project file.

2.2 FIELD SITE MANAGER (FSM):

The Field Site Manager (FSM) reports to the Project Manager. The FSM is the On-Site coordinator and overseer of operations. It is the FSM's duty to maintain Site security, supervise the Burns & McDonnell WCD personnel on the Site, coordinate the activities of the subcontractor personnel, serve as the on-scene incident commander, and check that the SHSP is followed and modified when necessary. The FSM responsibilities include:

- X The FSM is trained and certified in the HAZWOPER 8-hour Supervisor Training, First Aid, CPR and bloodborne pathogens as well as the Respiratory Protection Training, if required.
- X Order and arrange transport of PPE, air monitoring equipment, and calibration supplies needed for the project.
- X Provide, in the company vehicle, copies of Material Safety Data Sheets (MSDS) for on Site chemicals.
- X Bring appropriate number and type of fire extinguishers on the Site. If necessary, bring appropriate fire safety signage and flammable storage containers.
- X Bring and have available on the Site, a first aid kit as approved by ANSI Z308.1-1, 1998, and include equipment necessary to protect against bloodborne pathogens.
- X Provide a personal eyewash kit for each Burns & McDonnell WCD vehicle at the Site.
- X Provide an emergency spill cleanup kit for each vehicle at the Site.
- X Maintain copies of emergency procedures with a map of the hospital route in all Burns & McDonnell WCD Site vehicles and in the field office.
- X Make water and/or an electrolyte drink available, if conditions warrant.
- X Post Exit signs and require government and OSHA posters as appropriate in field offices.
- X Before Site activities, contact the hospital emergency room, local fire department, and local police department. If outside town, contact county officials and local emergency services.
- X Before drilling, boring, excavation activities have the location of buried utilities checked and marked and complete a Field Safety Checklist Intrusive Activities form for each area that will be investigated (Appendix B).

- X Correct and record into logbooks hazards found by SHSS or other Site workers. The hazard may be referred to the PM and/or PHSM for correction. If hazards are life threatening and can not be corrected then field operations must be shut.
- X Contact emergency personnel during an emergency.
- X Check that all employees, visitors, and subcontractors read and sign the SHSP before entering the Site.
- X Before drilling, or boring activities, check that overhead electrical lines are at least 10 feet away and that no other overhead obstructions are present, for voltages 0-50 kV. For voltages greater than 50 kV refer to OSHA 29 CFR 1926.550 (a) (15) and 29CFR 1910.333 (i) (1), Table 5-5.
- X In case of an accident, near-miss, or emergency response, conduct an investigation and document on the Incident Report Form in Appendix B, and submit to the PHSM and the project files.

2.3 PROJECT MANAGER/COORDINATOR (PM):

The Project Manager (PM) has the primary responsibility for the fulfillment of the terms of the contract and overseeing operations for the purpose that includes meeting legal and safety requirements. It is the PM's responsibility to keep the project on schedule, within budget, and communicate with the client regarding the progress toward specified goals. The PM will inform the Health and Safety Manager of all SHSP modifications, violations, injuries, and A near-miss situations. The PM responsibilities include:

- X Provide personnel time to read and understand the Site Health and Safety Plan (SHSP) before fieldwork.
- X Conduct project start-up health and safety briefing for: Field personnel, the Field Site Manager (FSM), the project team.
- X Check that subcontractor supervisors and Site workers have appropriate HAZWOPER Training Certificates.

- X Check that Site personnel, if required, have received Respiratory Protection Training, Fit testing and physician=s approval to wear a respirator.
- X That hazards identified during any Site audits are corrected. If necessary for immediate hazards, shut down field operations if hazards can not be corrected or the hazards present an immediate threat to life and health.

2.4 PROJECT HEALTH AND SAFETY MANAGER (PHSM):

The Project Health and Safety Manager (PHSM) is a Certified Industrial Hygienist (CIH) who is responsible for providing professional health and safety advice and oversight management to the project. The PHSM will review and provide support about concerns regarding the health and safety of field personnel assigned to this project, including:

- X approval of the SHSP,
- X approval of all modifications to the SHSP,
- X review of accident reports, inspections, and air monitoring results,
- X when required, the PHSM will conduct a field audit of the Site to evaluate the adequacy of the program and implement the necessary changes through the SHSP.

2.5 PROJECT FIELD TEAM:

The Project Team includes technicians, engineers, scientists, geologists, and possibly subcontractors who perform field activities. The Project Team reports to the FSM. Each individual team member will be responsible for understanding and personally complying with the SHSP and site health and safety requirements. Project Team members will report health and safety violations to either the FSM or the SHSS. Health and safety responsibilities, as discussed in this plan, which are shared by all Burns & McDonnell WCD Site personnel include:

- X Site employees who have a reasonable potential for entering the exclusion zone will have received 40 hours of initial HAZWOPER Training with an additional 24 hours of supervised field experience with 8 hours annual refresher thereafter.

X Retain copies at the Site of the following health and safety records:

- Current HAZWOPER Training Certificate.
- Respiratory Protection Training Certificate and current fit test record for potential respirator users.
- Physician's approval for hazardous-waste fieldwork and/or respirator use.
- First Aid/CPR and bloodborne pathogens training certificate.
- Confined space training certificate, if required.

X At least one person will drive the route to the hospital before beginning fieldwork.

X Conduct air monitoring using instruments and procedures given in Section 4 of the Site Health and Safety Plan (SHSP).

X Follow proper electrical safety including use of ground-fault circuit interrupters on extension cords, used outdoors, and unless electrical equipment is of the double-insulated type, use 3-pronged electrical cords on all electrical equipment.

The following individuals will have the authority and responsibility to change the levels of protection and, if necessary, shut down field operations:

X SHSS

X FSM

X PM

X PHSM

* * * * *

3.0 – HAZARD COMMUNICATION

3.1 PROJECT TASKS

Table 1 (see Appendix A) is a summary of the various project tasks, operations within each task, associated risks, and personal protection requirements.

3.2 HEALTH ANALYSIS AND CHEMICAL RISK ASSESSMENT

Table 2 (see Appendix A) is a summary of the various physical, chemical, radiological, and/or biological hazards that may potentially be encountered, their associated health risks, and necessary protective action. Many chemical substances listed in these tables are not anticipated to be present in sufficient quantities or concentrations in air, soil, or groundwater to present a hazard to personnel. The principal chemical contaminants at the site are expected to be PCBs, lead, Chromium, cadmium, radioactives (Cs-137), Total Petroleum Hydrocarbons, Benzene, Toluene, Ethyl Benzene, Xylene (BTEX), PAHs, suspect transformer oils, and suspect asbestos falling within the building.

Chemicals may be purchased and transported to the site to support site characterization and remediation operations. The Hazard Communication Standard (29 CFR 1910.1200 and 29 CFR 1926.59), requires Burns & McDonnell WCD to provide employees, contractors, subcontractors, and visitors with information on the health effects of these chemicals and necessary actions to protect against exposure. This information is transmitted through Material Safety Data Sheets (MSDS), container labels, training, and a written Hazard Communication program.

Site activities will adhere to the Burns & McDonnell Hazard Communication Program as described in the *Burns & McDonnell Corporate Health & Safety Policy and Procedure Manual, Chapter 8*. All site personnel, including subcontractors, will be briefed on this Program as part of the site orientation training before starting work. In accordance with this Program, the PM and FSM will check that each chemical brought to the site is accompanied by its MSDS. A copy of each MSDS will be made available to each site employee who may be potentially exposed to the chemical. In addition, the FSM will check that all subcontractors bring at least two (2) copies of MSDS for each chemical they bring onto the site. The FSM will also check that all chemical containers brought to the site to determine if they are labeled as to its contents and appropriate hazard warnings.

3.3 RISKS ASSOCIATED WITH DRILLING AND INTRUSIVE ACTIVITIES

During drilling operations, the subsurface is penetrated to obtain soil and/or groundwater samples. Contaminated soil cuttings and groundwater may be brought to the surface, creating a potential for exposure through skin contact and inhalation of vapors. The open borehole also creates a conduit for vapors to be released to the atmosphere. However, the amount of vapors released to the atmosphere is relatively small and vapors are usually quickly diluted and dispersed in air. Air monitoring is required to determine if protective equipment is necessary, as described in Section 4.0 of this SHSP. Air monitoring results should be recorded as dictated in the work plan or in a field logbook.

In addition to these chemical risks, the risk of drilling into a buried utility, such as a gas or electric line, is always present. Risks of injury associated with the drilling operation itself also exist. The risks of working near overhead electrical lines may also present a safety hazard. The SHSS will check for the presence of overhead lines and other obstructions. No drilling operations will be performed within 10 feet of overhead lines with voltages 0-50 kV, other voltages refer to 29 CFR 1926.550 (a) (15) and 29 CFR 1910.333 (i) (1). Each drilling location will have a Field Safety Checklist - Intrusive Activities filled out before drilling activities begin (see Appendix B).

3.4 NOISE HAZARDS AND CONTROLS

Exposure to high levels of noise may occur when working near drill rigs or other heavy equipment. Also, depending upon where the work is being performed, local equipment (e.g., airports, factory machines, etc.) may produce high levels of noise. The SHSS may evaluate employee noise exposures using a noise survey meter. The PHSM may conduct additional noise monitoring to determine the appropriate response to be taken. Employees will be provided with ear plugs and/or earmuffs that have a sufficient noise reduction rating to protect their hearing in accordance with 29 CFR 1910.95.

* * * * *

4.0 – AIR MONITORING AND PERSONAL PROTECTIVE EQUIPMENT

4.1 SITE AIR MONITORING REQUIREMENTS

To prevent exposure to hazardous conditions and aid in the selection of personal protective equipment, monitoring for the presence of airborne contaminants will occur when knowledge of the Site indicates their potential presence. One or more of the following direct-reading instruments may be used to aid in this determination. Photoionization detectors (PID) and Flame Ionization Detectors (FID) will measure non-specific organic gases and vapors. These instruments should be calibrated at least 2 times per day. Combustible Gas Indicators (CGI) will detect explosive atmospheres. CGIs should be calibrated prior to and at the end of the day. Oxygen (O₂) meters will detect fluctuations in oxygen concentrations.

Colorimetric detector tubes supplement PID and/or FID readings to measure specific gases and vapors. Aerosol meters will measure airborne particulates and mists. Radiation survey meters are used for Sites with potential radioactive contamination. Other direct-reading instruments are available for use to monitor for the presence of specific airborne Site contaminants. Heat and cold stress monitoring may also be conducted in accordance with Section 5.0 of the SHSP.

The breathing zone of the employee(s) anticipated to have the highest potential for exposure for each task will be monitored using an appropriate combination of some or all of these direct-reading instruments. Air monitoring will occur every 15 minutes during non-intrusive activities, or every 5 feet of penetration during intrusive activities. Site tasks and air monitoring requirements are shown in Table 4-1. Additional Site monitoring may occur at the discretion of the SHSS, FSM, or PHSM.

All air monitoring equipment must be calibrated as per manufacturer's instructions.

Table 4-1
Site Air Monitoring Requirements

Site Activity	Instrument	Frequency	Location	Caution
Excavating Pits	PID	Every 15 minutes or 5 feet of penetration	In breathing zone of person nearest activity	Communicate with equipment operator before sampling
	CGI	Every 15 minutes or 5 feet of penetration	In breathing zone of person nearest activity	Communicate with equipment operator before sampling
	Detector tubes	As indicated in Table 5-2 when exceed PID limits	In breathing zone of person nearest activity	Strong odors may require further testing.
	Radiation Survey Meter	Every 15 minutes or 5 feet of penetration	In breathing zone of person nearest activity	Radiation should be handled by outside consultant
Soil/ Water Sampling	PID	Every 15 minutes	In breathing zone of person nearest activity	Strongest likely concentration when opening cover
	Radiation Survey Meter	Every 15 minutes	In breathing zone of person nearest activity	Radiation should be handled by outside consultant
	Detector tubes	Every 15 minutes	In breathing zone of person nearest activity	Strongest likely concentration when opening cover

Positive air monitoring results obtained from the breathing zone during field activities will be recorded in field logbooks. The maximum reading and the location of the positive results from subsurface sample results will also be recorded in the field logbook. A negative reading for each air monitoring event does not need to be recorded in the field logbook. However, a general entry stating that monitoring was conducted with negative results will be recorded in the field logbooks. All such records will also include the location, date/time, weather conditions, person monitored, background concentration, and identification of specific contaminant whenever possible.

During Site activities, the calibration of all direct-reading instruments will be checked twice daily using calibration gas supplied or recommended by the specific instrument manufacturer. Documentation of daily instrument calibration will be recorded in the field logbooks in addition to the Field Calibration Record (see Appendix B). The Field Calibration Record will be kept with the project files.

Air monitoring information will be utilized to evaluate personnel exposure and assess the appropriateness of PPE for Site conditions. The PPE for the Site are discussed in Section 4.2. Photoionization detector (PID), combustible gas indicator (CGI), and detector tube readings measured in the employees breathing zone will be used to determine the level of protection required. PID readings refer to readings above background, which are sustained for at least 2 minutes and are measured during the performance of field tasks. PID readings are used for general screening. Levels of protection are specified for ranges of PID measurements.

Where radiation may be present, radiation survey meters will be used to determine the level of radiation present. This meter will be factory calibrated and used by only trained field personnel.

4.2 ACTION LEVELS FOR PERSONAL PROTECTION EQUIPMENT

The initial level of protection and the action levels at which the PPE will be upgraded are determined based on the identification of specific chemicals expected to be present at a Site and the established OSHA Permissible Exposure Levels (PEL) or ACGIH Threshold Limit Values (TLV=s), whichever is lower. In the event more than one chemical is expected or exists at a Site, the most hazardous chemical will dictate the level of personal protection required. Table 4-2 shows the action levels for levels of personal protection equipment.

Table 4-2
Action Levels for Personal Protection Equipment

Monitoring Equipment	Hazard	Action Level Above Background	Action
PID/ Benzene Tubes	Organic gas/ vapor	<1 ppm	Level D
		1 to 5 ppm sustained for 2 min	If PID >1 ppm use colorimetric benzene gas detector tubes (Sensidyne # 121SP) to evaluate protective action. If Benzene < 1 ppm No Protective Equipment needed If Benzene >1 ppm, Go to level C If Benzene >5 ppm Immediate withdrawal. Contact the PM and PHSM for instructions to proceed.
		>5 to <50 ppm	Level C.
		> 50 ppm	Immediate withdrawal. Contact the PM and PHSM for instructions to proceed.
CGI	Explosive Atmosphere	< 10 % LEL	Level D.
		10 % to 20 % LEL	Level D. Continue to monitor using extreme caution. Notify the SHSS and/or FSM.
		> 20 % LEL	Immediate Withdrawal. Explosive hazard. Contact the SHSS and PHSM for further instructions.
Oxygen Conc. Meter	O ₂ Conc.	< 19.5 %	Withdraw and upgrade to SCBA. Combustible gas readings are not accurate below this concentration! Notify SHSS.
		19.5 % to 23.5%	Level D. Check for airborne contaminants. Continue investigation with caution.
		> 23.5 %	Immediate withdrawal. Fire hazard potential. Notify the SHSS and/or the PHSM.
Radiation Survey Meter	Ionizing Radiation	< 1 mR/hr	Level D. Continue investigation.
		1 mR/hr to 2 mR/hr	Level D. Continue investigation with extreme caution. Note areas with elevated levels and contact a health physicist. Possible radioactive anomaly.
		> 2 mR/hr	Immediate withdrawal. Potential radiation hazard. Notify the SHSS and/or a health physicist.

Air monitoring equipment used on the Site should be calibrated with the following:

Calibration/Response Check

<u>Types</u>	<u>Frequency</u>	<u>Gas Standard</u>
PID	Twice Daily	100 ppm isobutylene in air
CGI	Twice Daily	Propane/Methane
Universal Test Pump-Sensidyne	Twice Daily	Leak Test: Insert unbroken detector tube into orifice, pull and lock handle in sampling position, wait 15-30 sec. And release handle. If handle does not return to 1/8", pump leaks.

(Refer to mfg for other pumps)

Field personnel, in conjunction with the FSM and SHSS, may choose to allow ventilation of vapors before resuming work (rather than using higher levels of PPE). If ventilation is conducted, additional air monitoring will be performed prior to the resumption of work to determine the level of PPE required.

4.3 LEVELS OF PROTECTION

Levels of protection for Site activities are described on the Site Air Monitoring Summary (see Page TC-6).

Level D includes the following equipment:

- X Work uniform
- X Disposable, inner nitrile gloves
- X Chemical-resistant boots with steel toe and shank
- X Safety glasses
- X Hard hat

- X Disposable, chemical-resistant outer boot covers*
- X Hearing protection*

The following levels of personal protective equipment (PPE) may also be necessary in the event that criteria for Level D protection are exceeded.

MODIFIED LEVEL D:

- X Same as Level D including disposable, chemical-resistant clothing (Tyvek)

LEVEL C:

- X Half-face or Full-face, air purifying respirator (MSHA/NIOSH approved)
- X Disposable, hooded, chemical-resistant clothing
- X Disposable, chemical-resistant outer gloves
- X Disposable, inner nitrile gloves
- X Chemical-resistant boots with steel toe
- X Disposable boot covers
- X Hard hat*
- X Coveralls*
- X Escape mask*
- X Two-way radios*
- X Face shield*
- X Hearing protection*

(* Optional Equipment)

4.4 RESPIRATORY PROTECTION

Respiratory protection requirements are described in detail in the Burns & McDonnell Respirator Program as found in the *Burns & McDonnell Corporate Health & Safety Policy and Procedure Manual, Chapter 8*.

Basic rules of respiratory usage are listed below:

- X Facial hair that interferes with a satisfactory fit of the mask-to-face seal is not allowed on personnel required to wear respirators.
- X Respirator cartridges should be replaced after approximately 8-hours of continuous or intermittent usage, unless otherwise noted. Cartridges should also be replaced if they become damaged, after

the expiration date is exceeded, if vapor smell breakthrough occurs, or if filters become clogged causing resistance to breathing.

- X Contact lenses may be worn when respiratory protection is required, in conjunction with additional eye protection to protect against particles or splashes, provided there is no interference with the respirator seal.
- X Respirators shall be cleaned and disinfected after each day's use or more often, if necessary.
- X Prior to donning, respirators will be inspected for worn or deteriorated parts. Emergency respirators or self-contained devices will be inspected at least once a month and after each use.
- X After donning, personnel should perform a positive and negative user fit-check to determine if a good seal has been achieved.
- X The employee will be familiar with all sections of the established respirator program found in the Corporate Burns & McDonnell Health & Safety Policy and Procedure Manual, Chapter 8.

* * * * *

5.0 – HEALTH SURVEILLANCE PROGRAM

5.1 EMPLOYEE MEDICAL EXAMINATIONS

All BMWCD employees involved in work at the Site will participate in a medical surveillance program administered under the direction of an Occupational Physician. The physicals shall meet the minimum requirements established by the OSHA's standard for Hazardous Waste Operations and Emergency Response. This program will include an annual medical evaluation.

Additionally, when respirators are required (as determined by the SHSS and project manager), each employee will be evaluated to determine physical ability to perform work while using respiratory protective equipment in compliance with 29 *CFR 1910.134*.

A post project, follow-up exam may be required if an exposure incident is reported or an employee shows specific symptoms associated with the known or suspected hazardous chemicals. The HSM and the BMWCD Project Manager will determine when post project exams are required.

5.2 HEAT STRESS PROGRAM

5.2.1 Training

The SHSS will have received training developed by the American Red Cross in first aid and cardiopulmonary resuscitation (CPR), including training in heat-related illnesses.

Workers should be capable of recognizing and treating the signs and symptoms of heat stress conditions. During potential heat stress conditions, ice should be readily available to rapidly cool victims.

5.2.2 Body Fluid Replacement

Water will be made available at the Site for employee fluid replacement. When heat stress is determined to be a problem by the SHSS, employees will be provided with balanced, electrolyte solutions to replace fluid and electrolyte loss. Employees will be provided with replacement fluids at a minimum rate of 8 ounces each half hour per person.

5.2.3 Environmental Monitoring

Heat Stress and heat strain are conditions resulting from environmental factors including temperature, relative humidity, radiant heat transfer, and air movement, as they are affected by clothing. The primary

objective of the heat stress management program is to prevent heat stroke which is life threatening and the most serious of the heat-induced disabilities.

5.2.4 Rest Breaks

When heat stress conditions are applicable, all rest breaks should be taken out of the zone of exclusion into a cooler, shaded, rest area. If these conditions are not available, more frequent rest breaks will be taken.

5.2.5 Medical Monitoring

Always monitor sign and symptoms of heat-stressed workers. When water vapor impermeable clothing is worn, exposure to environmentally induced or activity induced heat stress will be discontinued for a person when:

- X Sustained heart rate is greater than 160 beats per minute for those under 35 years of age; and 140 for 35 years or older.
- X Deep body temperature is greater than 38 degrees °C (100 degrees °F), or
- X There are complaints of sudden and severe fatigue, nausea, dizziness, lightheadedness, or fainting, or
- X There are periods of inexplicable irritability, malaise, or flu-like symptoms, or
- X Sweating stops and the skin becomes hot and dry.

Procedure

The employee's pulse rate will be used to monitor their individual response to environmental and internal heat load. To measure the heart rate (pulse), have the individual employee monitor their radial pulse by counting the number of pulse beats in a 10-second time span, multiplying the number of pulse beats counted by six to calculate the pulse rate in beats per minute, and comparing the results with the chart below. This monitoring program will become effective when the ambient work area temperature exceeds 77°F. The pulse rate will be monitored at the beginning and end of each shift and during each rest break.

<u>Heart Rate</u>	<u>90-100</u>	<u>100-110</u>	<u>110-120</u>	<u>120-130</u>	<u>130-140</u>	<u>140-150</u>	<u>Above 150-180</u>
Work Time (continuum)	>8 hr	8 hr	2 hr	1 hr	30 min	15 min	4-6 min

Pulse Rates between 60 to 90 beats per minute are considered normal and regularly scheduled work hours are recommended.

For unacclimatized workers, the lower pulse rate from each range should be used for the first 2 weeks.

5.3 COLD STRESS MONITORING

This procedure applies to all employees who perform fieldwork in cold environments at risk of cold stress injury.

5.3.1 Environmental Monitoring

Frostbite and hypothermia are two types of cold injury that personnel must be protected against during the performance of field duties. Two factors influence the development of a cold injury:

- X Ambient temperature
- X Wind velocity

The SHSS will monitor environmental conditions by recording ambient temperature and estimated wind-speed. Information contained in Tables 5-1 and 5-2 will be used to evaluate the possibility of hypothermia among workers on-Site.

5.3.2 Protective Clothing and Rest Breaks

Using appropriate cold weather protective clothing when temperatures are at or below 40°F exposed skin surfaces must be protected. These protective items can include facemask, hand wear, and foot wear. Workers handling evaporative solvents during cold stress conditions will take special precautions to avoid soaking gloves and clothing because of the added danger of prolonged skin contact and evaporative cooling. Personnel will wear protective clothing appropriate for the level of cold and planned physical activity. The objective is to protect all parts of the body, with emphasis on the hands and feet. Eye protection against a glare and ultraviolet light will be worn in snowy and icy conditions.

The work rate should not be so great as to cause heavy sweating that could result in wet clothing. If heavy work must be done, opportunities for rest breaks will be provided where workers have the opportunity to change into dry clothing. Conversely, plan work activities to minimize time spent sitting or standing still. Rest breaks should be taken in a warm, dry area. Windbreaks can shield the work area from the cooling effects of wind.

5.3.3 Identification and Treatment of Cold Stress

When frostbite, hypothermia, or other cold stress symptoms are suspected, treat the patient to relieve symptoms or transport them to the medical facility identified in Section 9.0.

5.3.4 Training

Burns & McDonnell WCD workers have been trained in cold stress as part of their HAZWOPER 40-hour initial training. Site workers will receive refresher training by the SHSS in cold stress safety and health procedures. The training program will include, as a minimum, instruction in the following areas:

- X Proper first aid treatment

- X Proper clothing practices

- X Proper eating and drinking habits

- X Recognition of impending frostbite

- X Recognition of the signs and symptoms of impending hypothermia or excessive cooling of the body when shivering does not occur

- X Safe working practices

The SHSS will be trained by the American Red Cross in first aid, CPR, and cold stress conditions.

TABLE 5-1
Threshold Limit Values Work/Warm-up Schedule
for Four-Hour Shift*

Air-Temperature--Sunny Sky		No Noticeable Wind		5 mph Wind		10 mph Wind		15 mph Wind		20 mph Wind	
°C (approx.)	°F (approx.)	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks
-26° to -28°	-15° to -19°	(Norm. Breaks) 1		(Norm. Breaks) 1		75 min	2	55 min	3	40 min	4
-29° to -31°	-20° to -24°	(Norm. Breaks) 1		75 min	2	55 min	3	40 min	4	30 min	5
-32° to -34°	-25° to -29°	75 min	2	55 min	3	40 min	4	30 min	5	Non-emergency work should cease	
-35° to -37°	-30° to -34°	55 min	3	40 min	4	30 min	5	Non-emergency work should cease		Non-emergency work should cease	
-38° to -39°	-35° to -39°	40 min	4	30 min	5	Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease	
-40° to -42°	-40° to -44°	30 min	5	Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease	
-43° & below	-45° & below	Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease	

- *1. Schedule applies to any 4-hour work period with moderate to heavy work activity, with warm-up periods of ten. (10) Minutes in a warm location and with an extended break (e.g., lunch) at the end of the 4-hour work period in a warm location. For Light-to-Moderate Work (limited physical movement): apply the schedule on step lower. For example, at -35°C (-30°F) with no noticeable wind (Step 4), a worker at a job with little physical movement should have a maximum work period of 40 minutes with 4 breaks in a 4-hour period (Step 5).
2. The following is suggested as a guide for estimating wind velocity if accurate information is not available: 5 mph: light flag moves; 10 mph: light flag fully extended; 15 mph: raises a newspaper sheet; 20 mph: blowing and drifting snow.
3. If only the wind chill cooling rate is available, a rough rule of thumb for applying it rather than the temperature and wind velocity factors given above would be 1) special warm-up breaks should be initiated at a wind chill cooling rate of about 1750 watts per square meter (W/m^2); 2) all non-emergency work should have ceased at or before a wind chill of 2250 W/m^2 . In general, the warm-up schedule provided above slightly undercompensates for the wind at the warmer temperatures, assuming acclimatization and clothing appropriate for winter work. On the other hand, the chart slightly overcompensates for the actual temperatures in the cooler ranges because windy conditions rarely prevail at extremely low temperatures.
4. TLVs apply only for workers in dry clothing.

* Adapted from Occupational Health & Safety Division, Saskatchewan Department of Labor.

TABLE 5-2
Cooling Power of Wind on Exposed Flesh Expressed as
Equivalent Temperature (under calm conditions)*

Estimated Wind Speed (mph)	Actual Temperature Reading (degree's F)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
	Equivalent chill Temperature (degree's F)											
calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
(Wind speeds > 40 mph have little additional effect)	LITTLE DANGER				INCREASING DANGER				GREAT DANGER			
	If < hr with dry skin. Maximum danger of false sense of security				Danger from freezing of exposed flesh within one minute.				Flesh may freeze within 30 seconds.			
	Trench foot and immersion foot may occur at any point on this chart.											

* Developed by U.S. Army Research Institute of Environmental Medicine, Natick, MA

* * * * *

6.0 -- SITE SECURITY AND CONTROL

Restricted Site areas will include, but not necessarily be limited to, the following zones:

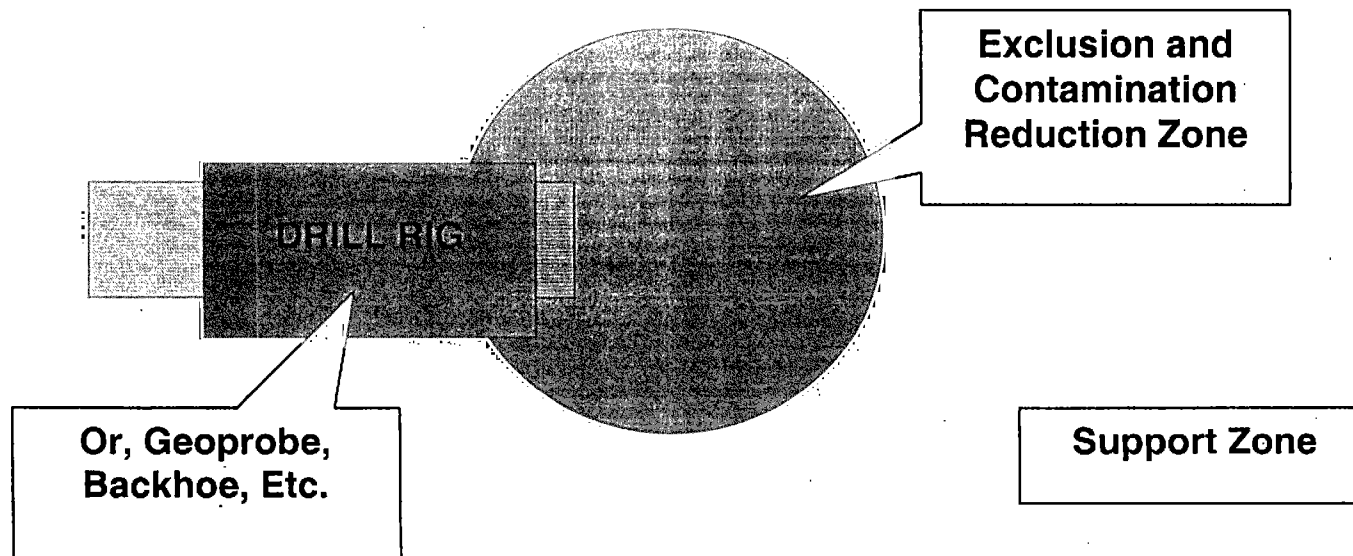
- X **Zone of exclusion** - any area where contamination is either known or likely to be present in concentrations that could pose a threat to human health and safety or that potential for harm to personnel exists because of the type of work activities being conducted.
- X **Contamination reduction zone** - any area where workers conduct personal and equipment decontamination.
- X **Support zone** - areas where access is controlled, but the chance to encounter hazardous materials or conditions are minimal.

The establishment of these specific zones will be based upon the location of intrusive activities, air monitoring results, and Site environmental/topographic features. The zone of exclusion and contamination reduction zone will be demarcated with flags, caution tape, or other readily visible means. If working in a busy area, the zone should be built as to physically keep people out. The zone of exclusion and contamination reduction zone will initially be within a 20-foot radius of drilling or sampling operations. The exclusion and contamination reduction zone may be one designated zone and is subject to change based on the extent of contamination levels. Air monitoring will be conducted to determine contamination levels. The SHSS will restrict access to this area to Site investigation personnel. The personnel documentation station will be located at the entrance to the demarcated area. Figure 6-1 is an example of a work zone.

In the event on-Site personnel must upgrade their personal protective equipment, the work zones may require substantial modification in order to provide for the safety of nearby personnel not associated with this work. Any upgrade level will be communicated by the FSM to the PM. The PM will then inform the PHSM of this occurrence.

* * * * *

FIGURE 6-1
TYPICAL EXCLUSION ZONE



7.0 – DECONTAMINATION PROCEDURES

7.1 PERSONNEL DECONTAMINATION

All personnel must complete appropriate decontamination procedures in a way that is responsive to actual Site conditions before leaving the Site. The decontamination of personnel and equipment will be performed within the exclusion and contamination reduction zones. Wash tubs containing an appropriate decon solution and soft bristle brushes will be used to decontaminate personal protective clothing and boots. Deionized water will be used for the final rinse. The SHSS will visually inspect all PPE and other equipment once decontamination procedures are completed. In general, the four types of decontamination solutions to be considered for PPE include:

- X Water for removal of low-molecular weight hydrocarbons, inorganic compounds, salts, some organic acids, and other polar compounds.
- X Dilute acids (vinegar) for removal of basic (caustic) compounds, amines, and hydrazines.
- X Dilute bases (soaps and detergents) for removal of acidic compounds, phenols, thiols, and some nitro and sulfonic compounds.
- X Organic solvents for removal of nonpolar compounds (organic).

The following procedures should be used when decontaminating personnel or equipment:

LEVEL D

- X Establish a segregated equipment drop
- X Remove disposable, outer boot covers, if applicable
- X Remove chemical resistant, outer gloves, if applicable
- X Remove hard hat and goggles, safety glasses, or face shield
- X Remove disposable, inner gloves

MODIFIED LEVEL D

- X Establish a segregated equipment drop
- X Remove disposable, outer boot covers

- X Remove chemical resistant, outer gloves
- X Remove chemical resistant suit
- X Remove hard hat and goggles, safety glasses, or face shield
- X Remove disposable, inner gloves

LEVEL C

- X Establish a segregated equipment drop
- X Remove disposable, outer boot cover
- X Remove chemical resistant, outer gloves
- X Remove chemical resistant suit
- X Remove full-face air purifying respirator
- X Remove first pair of disposable latex gloves

Each individual will be responsible for inspecting and decontaminating their own respirator in accordance with the Burns & McDonnell Respirator Program as described in the *Burns & McDonnell Corporate Health and Safety Policy and Procedure Manual, Chapter 8, Appendix A*.

At a minimum the hands and face of each employee must be thoroughly washed upon leaving the work area. Trash receptacles will be provided for all disposable clothing. All waste materials (including decontamination solution, contaminated PPE, chemical spills, etc.) generated during the field investigations will be handled, stored, transported, and disposed of in accordance with federal, state, and local regulations. Commercial laundries or cleaning establishments that decontaminate clothing or equipment will be informed of the potentially harmful effects of exposure.

7.2 EQUIPMENT DECONTAMINATION

The subcontractor will decontaminate field equipment according to the work plan. This may include manual removal of gross contamination with shovels or other tools, followed by a high-pressure, hot water sprayer. Because decontamination at the high-pressure, hot water station poses the possibility of a splash and/or mist inhalation hazard, the task should be performed using Modified Level D personal protective equipment at a minimum.

Field tool including split-barrel soil samplers, brass liners, and sample knives and trowels will be decontaminated according to the Site work plan. The field tools may be scrubbed visually clean using a

detergent solution (liquinox) with water and a stiff, long-bristled scrub brush. Following the solution scrubbing, the tools may be rinsed with distilled water or isopropyl alcohol.

* * * * *

8.0 – STANDARD OPERATING PROCEDURES

The following standard operating procedures (SOPs) will be applied to each location and activity where work is performed on a hazardous chemical Site. As hazards increase or decrease on the Site, the applicability of each SOP must be determined by the SHSS with the approval of any changes by the Project Manager or the PHSM.

8.1 PERSONNEL PRECAUTIONS

1. Eating, drinking, chewing gum or tobacco, smoking, and any practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited in the exclusion and contamination reduction zone or in any area known to be contaminated.
2. When decontamination procedures for outer garments are in effect, the entire body should be thoroughly washed as soon as possible after the protective garment is removed.
3. Contact with contaminated or suspected contaminated surfaces should be avoided. When possible, do not walk through puddles, leachate, or discolored surfaces; kneel on the ground; or lean, sit, or place equipment on drums, containers, or the ground.
4. Medicine and alcohol can potentiate the effects from exposure to toxic chemicals. Personnel should not take prescribed drugs at hazardous waste operations where the potential for absorption, inhalation, or ingestion of toxic substances exists unless specifically approved by a qualified physician. Alcoholic beverage intake should be minimized or avoided.
5. All personnel must be familiar with standard operating safety procedures and any additional instructions and information contained in this SHSP. All visitors and subcontractors will read the SHSP before entering the Site.
6. All personnel will be aware of symptoms for heat or cold stress.
7. All personnel will be familiar with the chemicals used on-Site and the associated hazards as described in each respective MSDS. The MSDS for the chemicals on-Site will be available and located in the company vehicle. All personnel on-Site will be familiar with the Burns &

McDonnell Hazard Communication (HAZCOM) Program before performing any activities on-Site.

8.2 OPERATIONS

1. All personnel going to the Site must be adequately trained and thoroughly briefed on anticipated hazards, equipment, safety practices, emergency procedures, and communications.
2. All personnel must wear any required respiratory protective devices and clothing going into areas designated for wearing protective equipment.
3. Personnel on the Site must use the buddy system when engaged in Level C work as specified in OSHA 29 CFR 1910.120. The purpose of the buddy system is to provide rapid assistance to employees in the event of an emergency.
4. Visual contact must be maintained between pairs of Site and safety personnel. Entry team members should remain close to assist each other during emergencies.
5. Personnel should practice unfamiliar operations before the actual procedure.
6. Entrance and exit locations must be designated, and emergency escape routes delineated. Warning signals, for Site evacuation must be established by the SHSS before field activities.
7. Communications using radios, hand signals, or other means must be maintained between initial entry members at all times. Emergency communications should be prearranged in case of radio failure, the necessity for evacuating the Site, or other reasons.
8. Wind indicators visible to all personnel should be strategically located throughout the Site.
9. Personnel and equipment in the contaminated area should be minimized, consistent with effective Site operations.
10. Work areas for various operational activities will be established.

11. Procedures for leaving a contaminated area will be planned and implemented before going to the Site. Work areas and decontamination procedures will be established based on expected Site conditions.
12. Frequent and regular inspections of Site operations will be conducted by the SHSS to check compliance with this SHSP. If changes in operation occur, the SHSP must be modified to reflect these changes.
13. All electrical equipment (power tools, extension cords, instruments, radios, etc.) will conform with OSHA 29 CFR Part 1926.400 Subpart K. The SHSS will ensure that electrical equipment is free from recognized hazards that may cause physical harm to employees.
14. Fire prevention and protection (appropriate signs for flammable liquids, smoking areas, storage areas of combustible or flammable materials, etc.) will be according to OSHA 29 CFR Part 1926.150 Subpart F.
15. Site Safety meetings will be held daily to discuss anticipated Site conditions and daily activities. This meeting will be summarized in field logbooks.

* * * * *

10.0 -- EMPLOYEE TRAINING

All Burns & McDonnell WCD employees will participate in routine health and safety education and training programs. These programs are designed to provide employees with a thorough knowledge of hazardous materials, health and safety hazard potentials, and federal Occupational Safety and Health Administration (OSHA) requirements published in 29 Code of Federal Regulations (CFR) Part 1910. According to 29 CFR 1910.120(e), Site employees will have received 40 hours of initial Hazardous Waste Operations & Emergency Response (HAZWOPER) instruction and 24 hours of supervised field experience. In addition, project supervisory personnel, including the SHSS and FSM, will have received an additional 8 hours of specialized HAZWOPER Supervisor training. Attending HAZWOPER 8-hour annual refresher training maintains this initial training. It is the responsibility of the Project Manager and each subcontractor's supervising manager to determine if the subcontractor staff meets these training requirements.

The SHSS will conduct Site-specific health and safety briefing for field personnel before the start of all fieldwork. Briefing attendees will include the FSM, the Project Team, and emergency services personnel. Emergency services personnel should include fire, emergency services, and/or client personnel as appropriate. The contents of the Site-specific training will include the following:

- X Site-specific safety and health rules
- X Health effects of various chemicals used on the Site
- X Emergency response actions pertaining to operations on-Site

Daily safety meetings will be conducted to review past activities, plan ahead for new or changed operations, establish safe working procedures for anticipated hazards, and provide pertinent safety and health training and motivation. Daily meetings and Site-specific training will be documented in the field logbook by the SHSS.

All visitors entering the designated work zones will be subject to all applicable health and safety requirements during field operations at the Site. All visitors to a work Site will be given the opportunity to review the SHSP, will be escorted at all times, and will be required to stay a safe distance from Site activities. The SHSS will be responsible for determining the visitor's need to enter the contamination reduction zone. The FSM and/or the SHSS will be responsible for briefing all visitors on the Site hazards, Site safety precautions, and the Site emergency response plan.

* * * * *

APPENDIX A

TABLE 1 SUMMARY OF PROJECT HAZARDS

TABLE 2 CHEMICAL HAZARD SUMMARY

Table 1
SUMMARY of RISK

Job Task/Operation	INHALATION HAZARD	CONTACT WITH CONTAM. SOIL	NOISE HAZARD	HEAT STRESS	ELECTRICAL HAZ.	POTENTIAL FIRE HAZ.	CONTACT WITH CONTAM. LIQ.	COLD STRESS	COLLAPSE OF TRENCH	PHYSICAL INJURY	OVERHEAD POWER LINES	BURIED TANKS	UNDERGROUND PIPING	SKIN HAZARD	VENTILATION PROBLEM	CONFINED SPACE	SPILL LIQUIDS	VANDALISM	EQUIP. FREEZING	LEAKING LINES	SLOPE FAILURE	FALL INTO EXCAV.	ADJAC. FACILITIES	Level of	Air Monitoring
Excavation	x	x		x	x	x			x	x	x		x	x	x	x		x		x	x	x	x	Level D; Modified Level D or Level C If PID Indicates.	PID With 10.6 eV lamp; CGI;
Soil Sampling	x	x		x	x	x	x		x	x				x			x			x		x		Level D; Modified Level D or Level C If PID Indicates.	PID With 10.6 eV lamp; CGI;
Sampling of Soil and Water in Excavation.	x	x		x			x		x	x				x							x	x		Level D or Modified Level D. Level C If Indicated by FID/PID or detector tubes.	PID With 10.6 eV lamp; CGI; Detector tubes
Preparation of Samples for Laboratory	x	x	x	x			x	x		x				x			x							Level D	NA
Decontamination of Sampling Equipment	x	x		x			x			x				x			x							Level D	NA

KEY: BZ = Breathing Zone; eV = electronvolt, the output of the UV lamp. * = optional equipment

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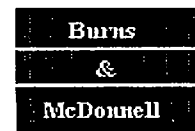


Table 1
SUMMARY of RISK

Job Task/Operation	INHALATION HAZARD CONTACT with CONTAM. SOIL NOISE HAZARD HEAT STRESS ELECTRICAL HAZ. POTENTIAL FIRE HAZ. CONTACT WITH CONTAM. LIQ. COLD STRESS COLLAPSE OF TRENCH PHYSICAL INJURY OVERHEAD POWER LINES BURIED TANKS UNDERGROUND PIPING SKIN HAZARD VENTILATION PROBLEM CONFINED SPACE SPILL LIQUIDS VANDALISM EQUIP. FREEZING LEAKING LINES SLOPE FAILURE FALL INTO EXCAV. ADJAC. FACILITIES																				Level of	Air Monitoring
Site Survey of Utilities		X			X				X	X	X										Level D Work Uniform	NA
Sampling oil from an electrical transformer	X			X	X		X		X			X			X	X					Modified Level D	NA
Dust Sampling	X			X					X												Level D	None anticipated based on scope of work
Changing Booms Containing Oils			X			X	X		X						X						Level D	NA
Operation of Heavy Equipment	X	X	X						X	X	X	X	X	X	X	X	X	X	X		Level D; Modified Level D or Level C if PID indicates	PID With 10.6 eV lamp; CGI; Detector tubes

KEY: BZ = Breathing Zone; eV = electronvolt, the output of the UV lamp. * = optional equipment

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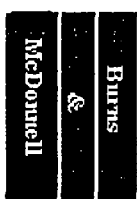


TABLE 2
CHEMICAL HAZARD SUMMARY

Chemical Identification	Exposure Limits In Air	Route of Entry	Health Effects	PPE	Properties
ASBESTOS Synonym: NA CAS#: 1332-21-4, UN 259	PEL: TLV: 0.1 Flcc REL: 0.1 Flcc IDLH: NA	Inh, Ing	None acute; long term, shortness of breath, Carcinogen. Asbestosis.	Glove Material: ANY Respirator: N100	LEL: NA IP: NA DOT: Miscellaneous Relative Density: Air: Solid Fibers Water:
BENZENE Synonym: Benzol CAS#: 71-43-2, UN 1114	PEL: 1 ppm TLV: 0.5 ppm REL: 0.1 ppm ca IDLH: [500 ppm]	Con, Ing, Inh	Irrit eyes, nose, resp sys, giddy; headache, nausea, stagger; anorexia, fatigue; bone marow (leukemia)	Glove Material: Butyl, Neoprene Respirator: Organic Vapor	LEL: 1.2% IP: 9.24 eV DOT: Flam. Liquid Relative Density: Air: Heavier Water: Floats
CADMIUM Synonym: Cadmium metal CAS#: 7440-43-9, UN 2570	PEL: 0.005 ug/m TLV: 0.01 mg/m3 REL: NA IDLH: 9 mg/M3, al	Inh, Ing	Pulm. dema, dysp, cough, chest tight, muscle aches., nau, career, kidney, metal fume fever	Glove Material: Any Respirator: N100	LEL: NA IP: NA DOT: Toxic Relative Density: Air: Solid Water: Solid
CHROMIUM SALTS, HEXAVALEN Synonym: Varies with Cpd. CAS#: Varies with Cmpd.	PEL: C 0.1 mg/m TLV: 0.05 mg/m3 REL: 0.001 mg/m IDLH: [15 mg/M3]	Inh, Con, Ing	Resp. sys. ir., perf. nasal septum, liver, kidney dam.; skin sens, Carcinogen	Glove Material: Nitrile, Butyl Respirator:	LEL: NA IP: NA DOT: Toxic Relative Density: Air: Solid (oxide) Water:



Date Prepared: 07/05/2001

KEY:		
[] - Latest Change	IDLH - Immediately Dangerous to Life and Health	NA - Not Applicable
ABS - Skin Absorption	ING - Ingestion	ND - Not Determined
APR - Air Purifying Respirator	INH - Inhalation	PEL - Permissible Exposure Limit
Ca - Carcinogen	IP - Ionization Potential (by UV Lamp)	REL - Recommended Exposure Limit
CON - Skin and/or Eye Contact	LEL - Lower Explosive Limit	TLV - Threshold Limit Value
DOT - Department of Transportation	LIQ - Liquid	

**TABLE 2
CHEMICAL HAZARD SUMMARY**

Chemical Identification	Exposure Limits in Air	Route of Entry	Health Effects	PPE	Properties
CHROMIUM SALTS, TRIVALENT Synonym: Varies with Cpd. CAS#: Varies with Cmpd.	PEL: 0.5 TLV: 0.5 mg/m ³ REL: 0.5 IDLH: 250 mg/M ³	Inh (dust), Con, Ing	Varies by exp. rte; Irrit. sens. skin.	Glove Material: Nitrile, Butyl Respirator: N95	LEL: NA IP: NA DOT: Toxic Relative Density: Air: Solid Water:
ETHYL BENZENE Synonym: Ethyl Benzol CAS#: 100-41-4, UN 1175	PEL: 100 ppm TLV: 100 ppm REL: 100 ppm IDLH: 800 ppm	Abs, Ing, Inh	Irrit eyes, muc memb; headache; dermatitis; narcosis, coma.	Glove Material: Viton Respirator: Organic Vapor	LEL: 0.8% IP: 8.76 eV DOT: Flamm. Liquid Relative Density: Air: Heavier Water: Floats
LEAD AND COMPOUNDS, MEASU Synonym: Lead CAS#: 7439-92-1, UN NA	PEL: 0.050 mg/m TLV: 0.050 mg/m REL: 0.100 mg/m IDLH: 100 mg/M ³	Inh., Ing, Con	Lassitude, Insomnia, Palor, Anorexia, Colic. Kidney disease.	Glove Material: Butyl, Viton, Nitrile Respirator: N100	LEL: NA IP: NA DOT: NA Relative Density: Air: Solid Water: Solid
PAHS Synonym: Polynuclear Aromatic Hydrocarbons; as Benzo(a)pyrene, Fluoranthene, Coal Tar Pitch CAS#: NA	PEL: TLV: REL: IDLH: 80 mg/M ³	Inh (dust), Abs	Photosensitiz; skin cancer, long term; Inh-possible lung cancer.	Glove Material: Nitrile Respirator:	LEL: NA IP: NA DOT: Relative Density: Air: Water:



Date Prepared: 07/05/2001

KEY:		
[] - Latest Change	IDLH - Immediately Dangerous to Life and Health	NA - Not Applicable
ABS - Skin Absorption	ING - Ingestion	ND - Not Determined
APR - Air Purifying Respirator	INH - Inhalation	PEL - Permissible Exposure Limit
Ca - Carcinogen	IP - Ionization Potential (by UV Lamp)	REL - Recommended Exposure Limit
CON - Skin and/or Eye Contact	LEL - Lower Explosive Limit	TLV - Threshold Limit Value
DOT - Department of Transportation	LIQ - Liquid	

**TABLE 2
CHEMICAL HAZARD SUMMARY**

Chemical Identification	Exposure Limits in Air	Route of Entry	Health Effects	PPE	Properties	
PETROLEUM HYDROCARBONS Synonym: (See also: Gasoline, Stoddard Solvent, VM&P) CAS#:	PEL: 500 ppm TLV: 100 ppm REL: 350 ppm IDLH: 1,100 ppm	Abs., Ing., Inh	Dizziness, Eye Irritation, Headaches, Kidney	Glove Material: Teflon	LEL: 1.1 %	Relative Density:
				Respirator: APR w/ OV Cartridge	IP: Usually<10.6 DOT: Flam. Liquid	Air: Heavier Water: Floats
POLYCHLORINATED BIPHENYL, Synonym: PCBs; PCB, 54%; Arochlor 1254 CAS#: 11097-69-1, UN 23	PEL: 0.5 mg/m3 TLV: 0.5 mg/m3 REL: 0.001 mg/m IDLH: [5 mg/M3] I	Inh, abs, Ing., Con.	Irrit. Eyes, Chloroacne; Liver Damage; [Ca], reproductive effects	Glove Material: Butyl, Neoprene, Viton	LEL: NA	Relative Density:
				Respirator: Organic Vapor, P95	IP: NA DOT: Miscellaneous	Air: Heavier Water: Sinks
POLYCHLORINATED BIPHENYL, Synonym: PCBs; PCB, 42%; Arochlor 1260 CAS#: 11096-82-5, UN 231	PEL: NA TLV: NA REL: NA IDLH: NA; use 42	Inh, Abs, Ing, Con	(From 42%-54%) Irrit. Eyes; Chloroacne; Liver Damage. Prob. Carcinogenic as 42%-54%.	Glove Material: Butyl, Neoprene, Viton	LEL: NA	Relative Density:
				Respirator: Organic Vapor, P95	IP: NA DOT: Miscellaneous	Air: Solid Water:
TOLUENE Synonym: Toluol; Methylbenzene CAS#: 108-88-3, UN 1294	PEL: 200 ppm TLV: 50 ppm REL: 100 ppm IDLH: 500 ppm	Abs, Con, Ing, Inh	Fainting, weakness, confusion, euphoria, dizziness, watery eyes. Liver & kidney damage.	Glove Material: Viton	LEL: 1.1%	Relative Density:
				Respirator: Organic Vapor	IP: 8.82eV DOT: Flamm. Liq.	Air: Heavier Water: Floats



Date Prepared: 07/05/2001

KEY:		
[] - Latest Change	IDLH - Immediately Dangerous to Life and Health	NA - Not Applicable
ABS - Skin Absorption	ING - Ingestion	ND - Not Determined
APR - Air Purifying Respirator	INH - Inhalation	PEL - Permissible Exposure Limit
Ca - Carcinogen	IP - Ionization Potential (by UV Lamp)	REL - Recommended Exposure Limit
CON - Skin and/or Eye Contact	LEL - Lower Explosive Limit	TLV - Threshold Limit Value
DOT - Department of Transportation	LIQ - Liquid	

**TABLE 2
CHEMICAL HAZARD SUMMARY**

Chemical Identification	Exposure Limits in Air	Route of Entry	Health Effects	PPE	Properties
XYLENES - (ORTHO) Synonym: Dimethyl Benzene CAS#: 1330-20-7, UN 1307	PEL: 100 ppm TLV: 100 ppm REL: 100 ppm IDLH: 900 ppm	Abs, Ing, Inh	Irritation eyes, nose, throat; dizziness, excit, drowsiness, staggering.	Glove Material: Neoprene, Viton Respirator: Organic Vapor	LEL: 0.9 % IP: 8.56 eV DOT: Flam. Liquid Relative Density: Air: Heavier Water: Floats

Information Sources:

NIOSH Pocket Guide 1997	3M - Glove
TLV Booklet 1998	3M - Respirator
29CFR 1910	North Respirator
Guide to Occup	IATA 1997 Dangerous Goods



Date Prepared: 07/05/2001

KEY:		
[] - Latest Change	IDLH - Immediately Dangerous to Life and Health	NA - Not Applicable
ABS - Skin Absorption	ING - Ingestion	ND - Not Determined
APR - Air Purifying Respirator	INH - Inhalation	PEL - Permissible Exposure Limit
Ca - Carcinogen	IP - Ionization Potential (by UV Lamp)	REL - Recommended Exposure Limit
CON - Skin and/or Eye Contact	LEL - Lower Explosive Limit	TLV - Threshold Limit Value
DOT - Department of Transportation	LIQ - Liquid	

APPENDIX B

**HEALTH AND SAFETY PLAN FIELD AMENDMENT
AGREEMENT AND ACKNOWLEDGMENT STATEMENT
FIELD SAFETY CHECKLIST - INTRUSIVE ACTIVITIES
FIELD CALIBRATION RECORD
INCIDENT REPORT FORM**

HEALTH AND SAFETY PLAN FIELD AMENDMENT FORM

Project Name: _____

Amendment Number: _____

Project Number: _____

Amendment Effective Date: _____

Location: _____

Changes in field activities or hazards:

Proposed Amendment:

Proposed By: _____
Site Health and Safety Supervisor or others

Date: _____

Approved By: _____
Project Manager

Date: _____

Project Health and Safety Manager

Date: _____

Declined By: _____

Date: _____

AGREEMENT AND ACKNOWLEDGMENT STATEMENT

Health & Safety Plan (SHSP) Agreement

Burns & McDonnell Waste Consultants Division Project Manager, Field Site Manager, Site Health and Safety Supervisor, and Health & Safety Manager have the authority to stop any work performed by Burns & McDonnell Waste Consultants Division subcontractors if it is not performed according to the requirements of this SHSP.

All Burns & McDonnell Waste Consultants Division project personnel and subcontractor personnel are required to sign the following agreement before performing work at the site.

1. I have read and fully understand the SHSP and my individual responsibilities.
2. I agree to abide by the provisions of the SHSP.

_____ Name	_____ Signature
_____ Company	_____ Date
_____ Name	_____ Signature
_____ Company	_____ Date
_____ Name	_____ Signature
_____ Company	_____ Date
_____ Name	_____ Signature
_____ Company	_____ Date

AGREEMENT AND ACKNOWLEDGMENT FORM
(continued)

Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
Company	Date

FIELD SAFETY CHECKLIST INTRUSIVE ACTIVITIES*

Project Number _____ Project Abbreviation _____
Field Location _____ Date _____

- | | <u>YES</u> | <u>NO</u> | <u>N/A</u> |
|---|------------|-----------|------------|
| 1. Reviewed work plans with client representative: | _____ | _____ | _____ |
| 2. Requested maps of aboveground and underground utilities: | _____ | _____ | _____ |
| 3. Reviewed utility maps (water supply, firewater, sewer, process sewer, electric, gas, telephone, other underground piping): | _____ | _____ | _____ |
| 4. Met with utility representative to review utility locations and asked each utility the following questions: | | | |
| a. Any underground utilities at work site? | _____ | _____ | _____ |
| b. Any ongoing construction that would affect field activities? | _____ | _____ | _____ |
| c. Any vapor releases associated with unit operations? | _____ | _____ | _____ |
| d. Any other hazards associated with operating units? | _____ | _____ | _____ |
| e. Any special requirements? | _____ | _____ | _____ |

5. Utility Representatives contacted:

Utility Representative Name: _____
Company: _____
Utility Representative names: _____
Company: _____
Utility Representative Name: _____
Company: _____
Utility Representative Name: _____
Company: _____
Utility Representative Name: _____
Company: _____

6. Utility Location Services Reference Number: _____

7. Final approval for commencement of work:

Site Health & Safety Supervisor Signature: _____

Subcontractor Foreman Signature: _____

NOTE: Field activities will commence only when this form and clearance have been approved by the SHSS.

* Intrusive activities include drilling, direct-push boring, and excavation activities.

Page ____ of ____

FIELD CALIBRATION RECORD

Equipment Item:		Mfr. Serial # B&M Equip. #		Project Abbr. Project No.		
Date Calibrated	Time	Known Standard	Instrument Reading	Adjustments Made	Calibrated By	Comments

Comments: _____

INCIDENT REPORT

Incident Date:	Incident Time:
Site:	
Project Number:	Project Abbreviation:
Person Completing Form:	
Date and Time of Report Completion:	
Affected Person(s):	
Summary and Cause of Incident:	
Recommended Corrective Action:	
Corrective Action Authorization Dept. or Project Manager Signature and Date: Health & Safety Manager Signature and Date:	

APPENDIX C
DRILLING OPERATIONS

C.0 DRILLING OPERATIONS

C.1 DRILLING RIG SAFETY

The following topics are the principal items that specifically address drilling rig safety procedures as part of the site health and safety guidelines. Each topic is explained in detail on the following pages:

- Overhead obstructions
- Underground utilities
- Turning or rotating machinery
- Vehicle issues
- Lightning and weather hazards
- Terrain and site characteristics issues
- Rig kill switch
- Use of tools

C.2 OVERHEAD OBSTRUCTIONS

1. Borings should not be drilled in locations that will place either the drill rig derrick, the drilling rods, or any part of the rig within 10 feet of overhead power lines when the derrick is in an upright position or is being raised or lowered.
2. Check for the presence of overhead lines and other obstructions while placing borings and before the start of the setup. Each time the drill rig derrick or drilling rods are raised or lowered, field personnel should check that overhead obstructions are not present. In addition, the BMCD field personnel should make sure they are not touching the rig while the derrick is being raised or lowered.
3. The driller should not move the rig with the derrick raised.
4. If any part of the drill rig will be closer than 10' to an overhead line with voltage 0-50kV, prior arrangements must be made to take the line out of service or have it booted (blanketed insulated) by the electric utility. For other voltages refer to Health and Safety Manager or USDOL OSHA 29 CFR 1910.333 (i) (1) and Table S-5 and 29 CFR 1926.550 (a) (15).
5. Whenever the drilling rig and associated vehicles are driving in areas of low overhead clearance,

including inside buildings. Do not move the rig until field personnel have checked that adequate overhead clearance exists beneath doors, piping, or any other structures. The driller should not move the rig until this has been checked.

C.3 UNDERGROUND UTILITIES

Several principles should be followed when investigation areas with underground utilities and tanks. The first principle is to minimize the amount of drilling in the immediate vicinity of known or suspected underground utilities. This may conflict with the intent of a project; for example, to drill as near as possible to underground tanks or pipeline bedding material, to investigate subsurface contamination, or to drill into pipeline bedding material. The overriding factor in planning a subsurface investigation should be to minimize the risk of damage to subsurface utilities and tanks because such damage may have consequences affecting safety and contamination.

The second principle is that areas proposed for drilling or excavation should be checked with regard to the utilities by the site owner and, where applicable, any public utilities that may have underground lines or tanks. It is illegal in some states to perform any subsurface excavation without calling the utilities clearance service for the state (e.g., Kansas One Call). Many owners and plant operators do not have clear knowledge about the locations of their underground utilities. Therefore, caution and discretion will be required to evaluate their judgements. Utility clearance, including the ticket number, utilities notified, and the names of all persons granting utility clearance will be recorded on the Field Safety Checklist, Intrusive Activities. The Field Safety Checklist, Intrusive Activities, provided in Appendix B, will be completed for each area.

The use of a metal finder or another type of utility-finding remote sensor may be used for underground utility location. This equipment should be used whether or not the local utilities or owner have acknowledged that the drilling location is clear of utilities. If uncertainty is present as to the location or existence of underground utilities or tanks, using a backhoe to carefully excavate down to common utility depths is warranted.

If a significant increase in resistance to drilling or digging occurs in an area where bedrock is not expected, STOP WORK immediately, reassess the situation, reevaluate the data on the locations of underground utilities, and do not proceed until safety has been verified. Call the Project Manager if any uncertainty exists as to the clearance of utilities.

In the event that underground utilities are encountered, the following steps should be taken:

1. Cease drilling or digging immediately.
2. Notify the Project Manager as soon as possible.
3. Notify the Group Manager as soon as possible.
4. Write a brief memorandum summarizing the event and transmit it as soon as possible to the Project Manager.

The risks of encountering underground utilities include the safety of personnel, financial risks of replacement and repair, and environmental risks of fuel leaks or other environmental problems caused by damaging utilities.

C.4 TURNING OR ROTATING MACHINERY

The principal hazard of turning or rotating machinery is the danger of snagging clothing or body parts. Therefore, the following guidelines should be observed:

- Whenever possible, stay at least two feet from turning or rotating machinery. This includes augers, cathead, engine power takeoff, and drill rods.
- If machinery must be approached closer than two feet, minimize the amount of time in close proximity to the machinery and use caution.
- Near turning or rotating machinery, be aware of where other workers are standing and moving so that no one is jostled into the machinery.
- Use particular caution when wearing baggy clothing, particularly Saranex™ or coveralls.
There is a related issue that requires caution: keep clear of the cathead rope at all times it may break while in use. It is often coiled on the ground; personnel should avoid stepping on it at all times.

C.5 VEHICLE ISSUES

In heavy traffic areas, use extra caution in moving around the site. Observe contractor personnel on the site to ensure their safety as well. Precautions that can be taken include traffic barricades, cones, signs, a flag person who keeps a constant watch on traffic, and blocking the work area with vehicles. The following traffic areas may be present at the investigation area and need to be considered:

- Highway and road shoulders
- City streets
- Parking lots
- Construction sites
- Quarry sites
- Industrial sites, including refineries, landfills, airports and factories

C.6 LIGHTNING AND WEATHER HAZARDS

Caution is necessary in the field with regard to the hazards of lightning. The drilling rig derrick may be particularly susceptible. The following precautions should be taken:

- Be aware of the weather to foresee and watch for the buildup of possible thunderstorms.
- Be prepared to demobilize and take cover before thunderstorms are too close.

Use extra care when working outside in inclement weather. Poor footing and difficulties in driving vehicles can result from wet or icy surfaces.

C.7 TERRAIN AND SITE CHARACTERISTICS ISSUES

Working around excavations and backhoe test pits necessitates the following precautions:

- Avoid the edge of the excavation.
- Watch for cracks forming in the ground near the edge of the excavation, a block of earth may be about to fall into the excavation.
- Never enter backhoe test pits. Work in excavations must be according to OSHA regulations.

- Watch the equipment operator so you are aware of the position of equipment at all times. When equipment or the excavation must be approached, signal for the operator to stop work.
- Keep away from the soil stockpile as it may be unstable, or you may place yourself in the way of moving machinery.
- Stay visible to the operator.
- Make clear signals to the operator, which are established before the start of work.
- Barricade the excavation, if necessary.

Working around drill rigs requires the following precautions:

- Watch the driller's operations to know where all machinery and equipment are located around the work site.
- Keep out of, or move cautiously, in areas where work is in progress, including the hoist and derrick, sample driving equipment, auger and drill rod storage and hoisting areas, water pump or compressor, and rig exhaust.
- Stay visible to the driller as much as possible.

Several things to watch for are:

- Stability of the rig:
 - Sliding of the rig in muddy conditions
 - Tipping or rolling of the rig on sloping or muddy ground
 - Tipping of the rig while the hydraulic leveling jacks are being raised or lowered
 - Tipping of the rig because of poor support structures or timbering under the hydraulic leveling jacks

- Possible collapse of the rig derrick
- Possible falling or flying rig and derrick parts
- Possible breakage of the Standard Penetration Test hammer
- Possible bending or breaking of drilling rods if the driller is inappropriately stacking the drill rods above the top of the derrick while pulling rods
- Beware of possible breaking of hydraulic lines.

Work at quarry and construction sites requires caution in the following areas:

- Stay well back from precipitous terrain and rock walls.
- Beware of falling rock.
- Coordinate your schedule to avoid blasting operations, and check in with the quarry operator before entering.
- Beware of heavy truck and vehicle traffic. Our presence is not always expected, and the visibility of operators of large equipment may be limited. Do not position yourself or your vehicle behind haul trucks.

Work inside buildings requires venting of the rig exhaust and monitoring of the air for exhaust gasses.

C.8 RIG KILL SWITCH

Learn where the rig kill switch is to shut the rig off in case of an emergency. A discussion should be held with the driller on each drill rig at the startup of the fieldwork to discuss the location and use of the kill switch.

C.9 USE OF TOOLS

BMCD personnel should not handle any of the subcontractor's drilling or construction tools, equipment, supplies, or machinery. This includes the following items:

- Drill rig controls
- Vehicles, including rigs, trucks, bobcats, dozers, and backhoes
- Hand tools, such as shovels, wrenches, hammers, and tremmie pipes
- Well construction materials, such as PVC pipe and cement

BMCD personnel may handle sampling devices themselves, such as:

- Split spoon samplers
- Shelby tubes
- Split barrel samplers
- Core barrel inner sleeves
- Sample sleeves

* * * * *

APPENDIX D
DIRECT PUSH

D.0 DIRECT PUSH

D.1 DIRECT PUSH

The following topics are the principal items that specifically address direct push safety procedures as part of the site health and safety guidelines. Each topic is explained in detail on the following pages:

- Underground utilities
- Hydraulic machinery
- Vehicle issues
- Site characteristics issues
- Kill switch
- Use of tools

D.2 UNDERGROUND UTILITIES

Several principles should be followed when investigation areas with underground utilities and tanks. The first principle is to minimize the amount of drilling in the immediate vicinity of known or suspected underground utilities. This may conflict with the intent of a project; for example, to drill as near as possible to underground tanks or pipeline bedding material, to investigate subsurface contamination, or to drill into pipeline bedding material. The overriding factor in planning a subsurface investigation should be to minimize the risk of damage to subsurface utilities and tanks because such damage may have consequences affecting safety and contamination.

The second principle is that areas proposed for drilling or excavation should be checked with regard to the utilities by the site owner and, where applicable, any public utilities that may have underground lines or tanks. It is illegal in some states to perform any subsurface intrusive activities without calling the utilities clearance service for the state (e.g., Kansas One Call). Many owners and plant operators do not have clear knowledge about the locations of their underground utilities. Therefore, caution and discretion will be required to evaluate their judgements. Utility clearance, including the ticket number, utilities notified, and the names of all persons granting utility clearance will be recorded on the Field Safety Checklist, Intrusive Activities. The Field Safety Checklist, Intrusive Activities, provided in Appendix B, will be completed for each area.

The use of a metal finder or another type of utility-finding remote sensor may be used for underground utility location. This equipment should be used whether or not the local utilities or owner have acknowledged that the drilling location is clear of utilities. If uncertainty is present as to the location or existence of underground utilities or tanks, using a backhoe to carefully excavate down to common utility depths is warranted.

If a significant increase in resistance to pushing occurs in an area where bedrock is not expected, STOP WORK immediately, reassess the situation, reevaluate the data on the locations of underground utilities, and do not proceed until safety has been verified. Call the Project Manager if any uncertainty exists as to the clearance of utilities.

In the event that underground utilities are encountered, the following steps should be taken:

1. Cease pushing immediately.
2. Notify the Safety Manager as soon as possible.
3. Notify the Group Manager as soon as possible.
4. Write a brief memorandum summarizing the event and transmit it as soon as possible to the Project Manager.

The risks of encountering underground utilities include the safety of personnel, financial risks of replacement and repair, and environmental risks of fuel leaks or other environmental problems caused by damaging utilities.

D.3 HYDRAULIC MACHINERY

The hazards of hydraulic machinery include the following guidelines:

- Stay at least two feet from the hydraulic systems.
- If machinery must be approached closer than two feet, minimize the amount of time in close proximity to the machinery and use caution.

- Be aware of where other workers are standing and moving so that no one is jostled into the machinery.
- Do not allow the operator to overdrive the sampler.

D.4 VEHICLE ISSUES

In heavy traffic areas, use extra caution in moving around the site. Observe contractor personnel on the site to ensure their safety as well. Precautions that can be taken include traffic barricades, cones, signs, a flag person who keeps a constant watch on traffic, and blocking the work area with vehicles. The following traffic areas may be present at the investigation area and need to be considered:

- Highway and road shoulders
- City streets
- Parking lots
- Construction sites
- Industrial sites, including refineries, landfills, airports and factories

D.5 SITE CHARACTERISTIC ISSUES

Working around direct push rigs requires the following precautions:

- Watch the operations to know where all machinery and equipment are located around the work site.
- Keep out of, or move cautiously, in areas where work is in progress, including the hoist and derrick, sample driving equipment, auger and drill rod storage and hoisting areas, water pump or compressor, and rig exhaust.
- Stay visible to the driller as much as possible.

Work inside buildings requires venting of the exhaust and monitoring of the air for exhaust gasses.

D.6 RIG KILL SWITCH

If the rig has a kill switch, learn where it is to shut it off in case of an emergency. A discussion should be held with the driller on each rig at the startup of the fieldwork to discuss the location and use of the kill switch. The switch may be a button, pull line, or pull switch.

D.7 USE OF TOOLS

BMCD personnel should not handle any of the subcontractor's tools, equipment, supplies, or machinery. This includes the following items:

- Direct push rig controls
- Vehicles, including rigs, trucks, bobcats, dozers, and backhoes
- Hand tools, such as shovels, wrenches, hammers, and tremie pipes
- Well construction materials, such as PVC pipe and cement

BMCD personnel may handle sampling devices themselves, such as:

- Samplers
- Sub and Shoe
- Liner

* * * * *

APPENDIX E
EXCAVATION SAFETY

E.0 EXCAVATION SAFETY

1926.800

E.1 GENERAL

Before excavating, trenching or drilling, complete the Excavation Checklist form located in this chapter. An equivalent written excavation checklist may be substituted for the form. The form shall be made available to the General Contractor upon request.

E.2 EXCAVATION

- X Before beginning an excavation, locate and mark underground utilities.
- X Do not enter an excavation deeper than five feet unless proper wall sloping, shoring, or benching has been completed or a trench box has been installed.
- X A stairway, ladder or earth ramp with a climbable slope and clear of obstructions must be located in excavations that are five feet or more in depth. Exits must be located so employees never travel more than 25 feet to exit the excavation.
- X All excavations deeper than 4 feet and containing a reasonable potential for gas build-up or oxygen deficiency (less than 19.5 percent oxygen) must be tested to ensure safe working conditions. Testing will be done before employees enter the excavation. (See Confined Space Entry chapter in this plan.)
- X Personnel will not work in excavations that contain accumulated water.
- X Except in stable rock, excavations below the foundation level of a nearby structure (such as a building or sidewalk) will not be permitted unless the structure is adequately stabilized to prevent collapse.
- X In excavations that personnel are to enter, excavated materials and nearby equipment should be properly stored at least two feet from the edge of the excavation.

- X A competent person will conduct daily inspections of excavations deeper than five feet if persons are expected to enter. Inspections should also be conducted after every rainstorm or hazard-increasing event.
- X Excavation and holes must be barricaded to protect pedestrians and vehicles.
- X Walkways or bridges with standard guardrails will be provided where employees or equipment are required to cross over excavations.
- X If a cave-in should occur while a worker is in a trench and the worker becomes entrapped, first summon the emergency rescue services at 911. Do not use heavy equipment in attempting to “dig-out” an entrapped worker. (The worker’s body location may have shifted due to the force of the soil and the heavy equipment may seriously injure the entrapped person.)

* * * * *

EXCAVATION CHECKLIST FORM

Project: _____

Excavation: _____ Schedule: _____

Contractor: _____ Foreman: _____

Purpose of Excavation: _____

- | | | | | | | |
|-------|---|-------------------|-----|-----|----------|-----|
| 1) | Utility Location: | Shown on Drawings | Yes | ___ | No | ___ |
| | | Field Located | Yes | ___ | No | ___ |
| 2) | Layout: Reviewed by Contractor & Construction Manager | | Yes | ___ | No | ___ |
| 3) | Planned Depth of Excavation: _____ | | | | | |
| 4) | Method of Stabilizing Sides: | Self Support | | ___ | | |
| | | Shoring | | ___ | | |
| | | Benching | | ___ | | |
| | | Slope | | ___ | | |
| 5) | Will Confined Space Entry be required? | | Yes | ___ | No | ___ |
| 6) | Method of Personnel Entry: _____ | | | | | |
| 7) | Method of Dewatering: _____ | | | | | |
| 8) | Maximum Length of Trench to be Open: _____ | | | | | |
| 9) | Accommodation for Traffic Across Trench: _____ | | | | | |
| 10) | Disposal of Soil: | ___ On Site | | ___ | Off Site | |
| 11) | Nearby foundations which will require shoring: _____ | | | | | |
| _____ | | | | | | |
| 12) | Daily Inspections of Open Trench by: _____ | | | | | |
| 13) | Nightly Barricading Required? | | Yes | ___ | No | ___ |

Field Supervisor

Contractor Foreman

Date _____

APPENDIX F
RADIOACTIVE MATERIAL SAFETY

Appendix F: RADIATION

29 CFR 1926.53 THROUGH 29 CFR 1926.54

C.1 IONIZING (X-RAY) NON-DESTRUCTIVE TESTING

- X The handling of radioactive materials may only be performed by competent person(s) specially trained in the proper and safe use of such hazards. The competent person is responsible for posting warning signs, erecting barriers and establishing the safe distance for others.

- X For activities involving the use of radioactive materials , not under license from the Nuclear Regulatory Commission (NRC) a competent person is defined as someone specifically trained in the proper and safe operation of the specific equipment. In the case of materials used under a NRC license, only persons actually licensed, or competent persons under the direction and supervision of the license shall perform such work.
